

Introduction

Twenty first century is facing global issues including environmental manipulation, climate change and global warming. Despite the age we are in, the magnitude, intensity and frequency of natural disasters have increased dramatically. Disasters claim thousands of lives, immense loss of man, material and resources throughout the world. Increasing population and subsequent developments in urbanization, use of degraded lands and manipulation within the environment has disturbed the natural process of nature.

Natural and human caused calamities are common globally. Disasters are one of them which come without prior warning with increased, magnitude, complexity, frequency and economic impact. A hazard through Disaster poses threats to people, community and nations. More than 200 times the earth had faced natural disasters, recording loss of around millions of people and property. Damage as % of GDP was greater in developing countries. India because of its geographical structure is considered worst disaster prone country. Poor topographical features, dense population, pollution give access to manmade and natural disasters. (Srivastava, 1997)

No one expects Disasters, but when they happen, they create havoc around the world. Every year, millions of people faces and experience the bitter and terrifying consequences of disaster. As a result it affects the community and finally the country faces loss of its habitants, communities and most of all the emotional hurt of bruised nation, leaving survivors to suffer its post affects by living in constant fear, depression and stress. (Clark, 1997)

During the time span of last thirty years, India had been hit by 431 major disasters. The wrath of disasters in last three decades, costing almost forty eight hundred crores loss of property and other valuables. (Srivastava, 1997)

Man has given access to natural disasters by creating hazardous environment causing escalated frequency and severity of natural Disasters. Deforestation, concrete jungle, and playing with natural resources to satisfy the hunger of becoming rich has made a man to forget the value of earth and its benefits. (Rao, 1997)

Disaster creates an imbalance between social, health, economic, and environmental condition. Floods are traumatic events that are experienced by many people and may result in a wide range of mental and physical ailments.(Norris et al., 2002).

Cloud bursts are particularly devastating disasters and have huge physical and psycho-social impacts on human life. Cloud burst in hilly areas are very common during rainy seasons, costing damage of human life and property specially the agricultural land.

Background of the Study

“Droughts, floods, earthquakes and cyclones devastate the country with grim regularity”. “They are spiralling out of control, increasing in frequency causing more injury, disability, mental illness, disease and death, adding to the Health and economic burden of an already improvised nation”. (Menon & Kara, 2006)

Talking about northern region of Uttarakhand, it's covered with mountains, extended in 53,483 square kilometer, composing landmass of 63 percentages of Indian sole. (Sing, 2008)

Climatic conditions are evidently different in Uttarakhand region. Alternation in temperature can be seen in different altitude. The wide range of area could be very hot during summer season and at the same time in other part of the region one can enjoy the snow fall. According to national wetland Atlas January is considered the coldest month. (National Wetland Atlas,2012)

Uttarakhand the “Dev Bhumi” a “Land of the Gods” has its own spiritual identity in many ways. The Ganges, the culture and tradition, the pilgrimage of Hindus and shrine of many believers makes this region very rich and important in many aspects. Economy of state primarily was dependent on tourism and agriculture, after the parting from U.P it has emphasized on mining, industrialization and rapid infrastructural developments. Although, the development is proved harmful to environment of state.

“Uttarakhand is an Indian Himalayan state known for its rich spiritual and religious tourism, ecological richness and diversity and cultural ethos rooted in traditions, but it is also known for growing frequency and intensity of natural

disasters, and for its fragility of ecological and geological systems; consisting most of the uplifted sedimentary and metamorphic rocks and tectonically very active, the region is vulnerable to natural disasters; due to its geo-climatic, ecological and socio-economic settings, Uttarakhand is one of the most disaster prone state of the country”. (Satendra et al., 2014)

As the state of river and mountains all around, the state has always been living under climatic threat of cloud burst, floods, landslides and flash floods etc. The frequency has increased with growing deforestations. Flood of 2013 is one of the natural disasters but the loss was more because of illegal constructions at upper regions. It was multiday cloudburst causes two states affected by massive flash floods. The history will remember the days of 14th June to 17th June. (Das, 2013)

“A massive landslide (in the north-east region of the Kedar valley) and heavy rainfall (in the north-west of the Kedar valley) occurred at the same time and formed a small lake”. (Kumar, 2013)

“About 14 km pedestrian route between Gaurikund and Kedarnath was completely washed away. Maximum damage occurred in Kedarnath, Guiaya, Lenchuri, Ghindurpani, Rambara, Gaurikund and downstream area up to Rudrapryag; the numerous side effects of the rainfall destroyed the state’s economic lifelines over 9000 km of roads and 225 bridges were damaged and 61 hydroelectric power plants 465 km distribution lines and 377 transformers were destroyed”. (Nanda et al, 2013)



Figure No: 1 Rudraprayag District in Uttarakhand



Figure No: 2 Satellite Image of North India in May, 2013 (pre- flood)

Source: NASA's Earth Observatory

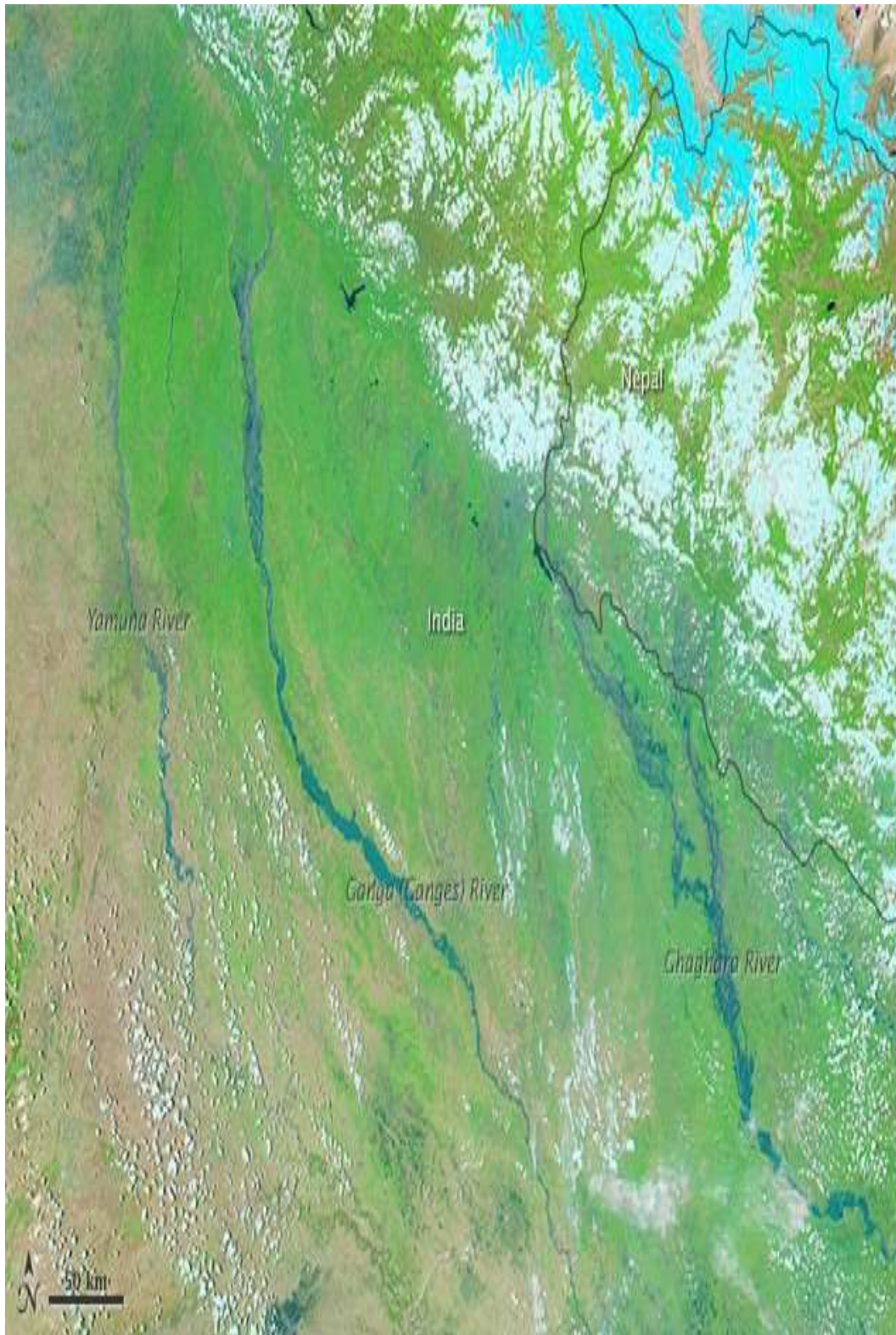


Figure No: 3 Satellite Image of North India in last week of June, 2013 (post flood)

Source: NASA's Earth Observatory



Figure No: 4 NASA satellite imagery of Northern India on 17th June (Cloud concentration)

Source: Wikipedia

Pre and post satellite image of Kedarnath valley



Image courtesy USAC

Figure No: 5 NASA satellite imagery of Northern India on 17 June (Kadernath pre and post flood comparison)

Source: Geospatial Applications

People died because of rainfall, chilling nights, scarce resources for medical help, food water and shelters. Approximately 4200 villages lost its road connectivity. (Sharma et al., 2014)

Natural disasters are thought to be associated with the mildest mental health consequences, although this assertion is not uniformly accepted. (Baum et al, 1983) (Robins et al., 1986).

“PTSD is characterized by intrusive thoughts, nightmares and flashbacks of past traumatic events, avoidance of reminders of the trauma, hyper vigilance and sleep disturbance” (Ahmadizadeh, 2010)

Natural Disasters have a negative impact on individual’s mental health. Not only do disaster survivors have an increased risk of developing PTSD and other mental ailments but their Health related Quality of Life (QOL) may also be curtailed. (Heo et al., 2008)

Quality of life according to WHO is as “individuals perception of their position in life in the context of the culture and value systems in which they live and relation to their goals, expectations, standards and concerns” (WHO, 1995) Post – disaster assessments could be helpful to plan the interventions for the individual suffering physically and mentally. It is also helpful to aid the community as a whole, by assessing the perception and depth of injury. (Chou et al., 2004) (Wang et al., 2000)

“The efforts of rehabilitation had started in Uttarakhand in full earnest. Under normal circumstances, people who have gone missing are declared dead only if they have not been heard of for seven years” (Kumar, 2013)

Rationale of the Study

In view of “the recent catastrophic flash flood in Uttarakhand with unprecedented death & destruction” and ample scope for further research into evident adverse outcomes from such calamities in disaster prone and vulnerable areas, the present study has been designed to measure the occurrence PTSD & H-QOL among the flash flood victims; also, evaluate the ongoing disaster preparedness and mitigation measures in the area of coverage. The current reviewing of literature, the knowledge of methodology and applications of comprehensive well researched indicators will help to address the recent issues. (Mahalingam V & Roy D, 2017)

Review of Literature

The literature review explores natural hazards and the human responses to those hazards by disaster victims. The review keeps in mind the perspective of research problem with many facets and brings into focus the problem enabling the design of an appropriate survey. Where information is lacking in journals or books the researcher has presented information from secondary data reports or the minutes of meetings held with the experts in disasters from the community.

Introduction

Natural and human caused calamities are common globally. Disasters are one of them which come without prior warning with increased, magnitude, complexity, frequency and economic impact. A hazard through disaster poses threats to people, community and nations. More than 200 times the earth had faced natural disasters, recording loss of around millions of people and property. Damage as % of GDP was greater in developing countries. India because of its geographical structure is considered worst among disaster prone country. Poor topographical features, dense population, pollution give access to manmade and natural disasters. (Srivastava, 1997)

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witnessed the wrath of disasters in last three decades, costing almost forty eight hundred crores loss of property and other valuables. (Srivastava, 1997)

Disaster creates an imbalance between social, health, economic, and environmental condition. ‘Floods are traumatic events that are experienced by many people and may result in a wide range of mental and physical ailments’. (Norris et al., 2002).

Children, pregnant ladies, aged humans, malnourished human beings and those who're sick or immune compromised, are in particular prone when a disaster moves and take a highly excessive percentage of the sickness burden related to emergencies. Poverty and its common outcomes including malnutrition, homelessness, poor housing and destitution – is a first-rate contributor to vulnerability. (WHO, 2014)

Wide range of health problems, deaths and diseases are caused by calamities. Cloud bursts are particularly devastating disasters and have huge physical and psycho-social impacts on human life. Cloud burst in hilly areas are very common during rainy seasons, costing damage of human life and property specially the agricultural land. (Noij, 1996) Disasters stimulate threatening conditions to one's life and the impact is lifelong. (Berg et al., 2008)

India is hit by one major natural disaster or the other almost every year whereas; the loss of life is accompanied by losses of the magnitude that is difficult to comprehend. (Sharma, 2005)

Disasters in Uttarakhand

During the last one hundred years, there have been a series of disasters in the Himalayan belt, earthquakes, flash floods and landslides being the major ones. (Nanda et al., 2015)

Talking about northern region of Uttarakhand, it's covered with mountains, extended in 53,483 square kilometres, composing landmass of 63 percentages of Indian sole. (Sing, 2008)

Climatic conditions are evidently different in Uttarakhand region. Alternation in temperature can be seen in different altitude. The wide range of area could be very hot during summer season and at the same time in other part of the region one can enjoy the snow fall. According to national wetland Atlas January is considered the coldest month. (National Wetland Atlas, 2012)

“The state consists of 320 km lengthy stretch of the mountains among the Kali river forming the Indo-Nepal border in the east and the lots-Pabar valleys forming the border of Himachal Pradesh within the west”. (Nanda et al., 2015)

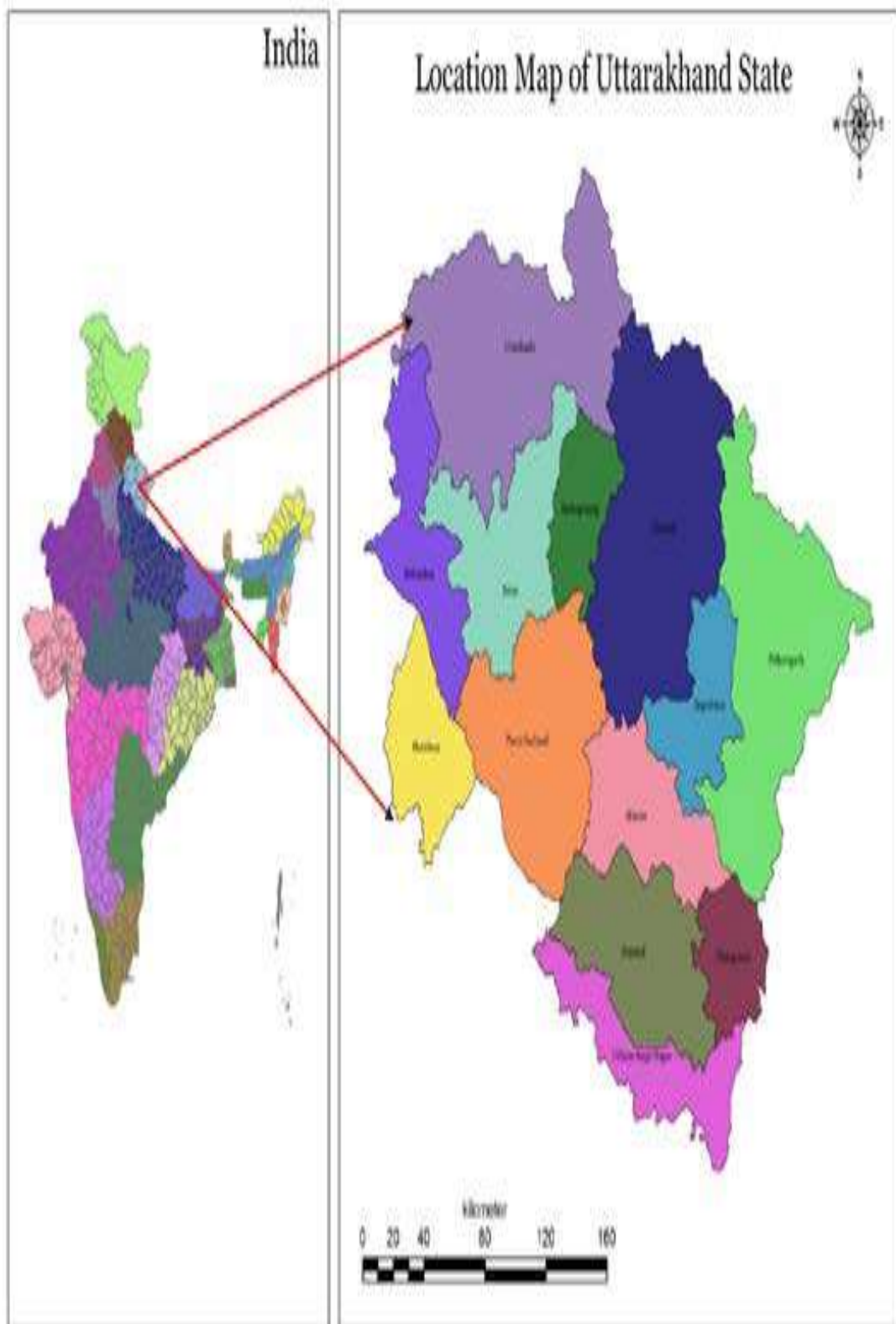


Figure No: 6 Location Map of Uttarakhand in India

As a state of river and mountains all around, the state has always been living under climatic threat of cloud burst, floods, landslides and flash floods etc. The incidents of disaster has increased with growing deforestations. Flood in 2013 is one of the great example of natural disasters but the loss was more because of illegal constructions at upper regions. It was a multiday cloudburst affected by massive flash floods. The history will remember the days of 14th June to 17th June (Das, 2013)

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“If 292 proposed and under construction dams in Himalayas are built, then Ganga basin would have the highest number of dams (1/18 km of river channel dammed) in the world, followed by the Brahmaputra (1/35 km) and the Indus (1/36 km)” (Kumar, 2013)



Figure No: 2 Landslides in Rudraprayag - Guptkashi road

Post Disaster Health Assessment

To provide holistic care to disaster survivors, detailed information regarding health must be obtained. Deep insight and prevention majorly depends on post disaster assessments tool. (Berg et al., 2008)

Disaster controls have to no longer only recognise on acute health care but different outcomes also that can affect the health of the populace and encompass economic issues evaluation. (Berg et al., 2008)

Research studies have brought to attention the fact that bodily signs and symptoms, except intellectual fitness troubles are part of the distress response following annoying publicity. (Berg B et al., 2008) (Lang et al., 2007)

A well being outcome evaluation after disaster allows to discover the group of survivors chance to develop chronic health troubles and occurrence of continual mental problems including post-traumatic strain disease than the others. (Grievink et al., 2004)

Studies with more insights in psychological aspects with physical health will help to improve less causality during and after disaster. (Berg B et al., 2008)

Sharma et al 2014 in a study reported that people died because of rainfall, chilling nights, scarce resources for medical help, food water and shelters. Approximately 4200 villages lost its road connectivity. (Sharma et al., 2014)

PTSD

During disasters, many more people are affected. The impact may not be immediate but studies shows the positive relationship between disaster and psychological problem. (Galea et al., 2005), (Norris et al., 2001), (Rubonis & Bickman, 1991)

“One of the most debilitating effects of traumatic experience is a condition called Posttraumatic Stress Disorder (PTSD)”. “This disorder is very common among victims/survivors of tormented exposure”. “The current literature suggests that factors contributing to increased risk of developing PTSD can be caused by many variables, including exposure to traumatic events”. (Lang et al., 2007)

“PTSD is characterized by intrusive thoughts, nightmares and flashbacks of past traumatic events, avoidance of reminders of the trauma, hyper vigilance and sleep disturbance”(Ahmadizadeh, 2010)

“The diagnosis of PTSD (as with all psychiatric disorders) is ideally made by a trained mental health professional following the criteria established in the DSM”. “Many post disaster studies make use of structured screening tools that have been shown to be valid instruments for the assessment of PTSD either by clinically trained persons or by laypersons”.(American Psychiatric Association, 1980) (Galea et al., 2005)

It's not unusual for many behavioural responses for disasters and catastrophic events. The height of the mental issues amongst survivors happens within the first

year after the onset of the catastrophe. The mental troubles because of disaster might also last for years if not dealt with early. (Norris, et al., 2001)

Young & Breslau, 2004 study reported that “The sample raw mean \pm SD for 24-hour dopamine levels was $381.5 \pm 34.8 \mu\text{g}/24 \text{ h}$; epinephrine, $11.0 \pm 9.1 \mu\text{g}/24 \text{ h}$ [$60.1 \pm 49.7 \text{ nmol/d}$]; and nor-epinephrine, $50.3 \pm 8.2 \mu\text{g}/24 \text{ h}$ [$297.3 \pm 48.5 \text{ nmol/d}$]. “There had been sizeable consequences of group membership at the 3 catecholamine ranges”. “The group with PTSD had higher implied degrees of all 3 urinary catecholamine’s as compared with the uncovered to trauma without PTSD and no exposure groups”. “Group wise comparisons also discovered tremendous differences among the uncovered to trauma without PTSD and no exposure groups in dopamine ($P = .02$) and epinephrine ($P = .02$) ranges, despite the fact that inside the contrary direction from the expected (i.e. lower in the uncovered to trauma without PTSD group than inside the no exposure organization)”. “Subjects with beyond vs current PTS did no longer range extensively on any catecholamine measure ($P > .25$)”. (Young & Breslau, 2004)

In a study by Nasar A, Zulqarnain S, Inayat A, Khan M N S (2016) study results showed that most common disorder found among flood victims was Posttraumatic Stress Disorder (PTSD) followed by Generalized Anxiety Disorder and Major depressive Disorder. After a typhoon disaster 61.93% of the victims showed positive results in screening for psychological stress symptoms and 399 (7.8%) were tested for having apparent PTSD symptoms. (Guo et al., 2016)

Health -QOL of Disaster Victims

In a study Norris, et al., 2001 stated that comparing the two different locations close to the epi-center of the earthquake, the closest location group “reported poorer physical health as measured by WHOQOL-BREF and more psychological symptoms in terms of somatisation and anxiety”.

Quality of life (QOL) according to WHO 1995 is “individuals perception of their position in life in the context of the culture and value systems in which they live and relation to their goals, expectations, standards and concerns”

In a region that has been significantly tormented by a drought, mortality may also increase sharply due to protein malnutrition (kwashiorkor) or calorie malnutrition (marasmus). Vitamin deficiencies, such as a lack of nutrition A, can result in particular outcomes such as xerophthalmia and infant blindness. Long standing malnutrition can accelerate the problems result in expanded rates of disorder and mortality and restriction of the overall populace’s functionality. (Dotto, 2002)

Xiangdong W, Huabiao Z, Chengzhi Z , Yucun S, Naotaka S 2011 reported that victims closes to the locations of an earthquake had poorer wellbeing as measured with the aid of standardized instruments and greater mental signs in terms of somatisation and tension.

The veterans in Gulf War reported physical health complaints and the results showed that the most common symptoms were back pain (mean = 1.96, SD = 0.97),

fatigue (mean = 1.90, SD = 0.88), muscle pain (mean = 1.69, SD = 0.85) and difficulty falling asleep (mean = 1.53, SD = 0.91). (Engel et al., 2000)

Post – disaster assessments could be helpful to plan the interventions for the individual suffering physically and mentally. It is also helpful to aid the community as a whole, by assessing the perception and depth of injury. (Chou et al., 2004) (Wang et al., 2000)

PTSD & H-QOL of Disaster victims

“Veterans with co-morbid PTSD were more likely to have clinically higher T-cell counts, hyper-reactive immune responses on standardized delayed cutaneous hypersensitivity tests, clinically higher immunoglobulin-M levels and clinically lower dehydroepiandrosterone levels; the later clinical evidence confirms the presence of biological markers consistent with a broad range of inflammatory disorders, including both cardiovascular and autoimmune diseases” (Boscarino, 2004)

“Compared with non-PTSD survivors, survivors with PTSD have been greater than two times as probably to be recognized by using their own family practitioners with vascular problems, even when adjusted for non-public traits, immigrant status, smoking conduct and pre-disaster vascular issues (OR = 2.12)”. “Survivors with PTSD had been also frequently identified with dermatological and musculoskeletal problems than survivors without PTSD”. “Compared with without PTSD, survivors with PTSD pronounced on common a large quantity of physical health”. (Dirkzwager et al., 2007)

Rick Nauert (2011) identified that symptoms tied to heightened arousal which include sleeping problem, irritability and vigilance were associated with decrease quality of life among PTSD sufferers. Anxiety and depression have been additionally related to lower first-rate of life.

“Significant negative relation between stress and quality of life; and significant positive correlations between support from family as well as support from friends with quality of life”. “Stress and support from family were found to be significant predictors that influence the quality of life among flood victims”. (Marzuki et al., 2015)

Posttraumatic stress and depression confirmed considerable poor relations to QOL; in comparison. Consequently, individuals who stated the catastrophe brought approximately advantageous private adjustments did no longer document higher stages of QOL. (Jennifer et al., 2008)

Factors contributing Development of PTSD symptoms and H-QOL of Disaster Victims

“Less food & accommodation facilities and less health care facilities caused higher prevalence of PTSD”. (Wen et al., 2012)

Males had a better level of social support, psychological wellbeing and quality of life as compared to females. This reveals the fact the females are more prone towards developing psychological symptoms and ailments like PTSD. (Dirkzwager et al., 2007)

Another study showed that the people belonging to low socioeconomic status were not prone to developing stress reaction as well as symptoms of Post-Traumatic Stress Disorder (PTSD). This can be due to the fact the people living in the community sample had approximately the same level of income annually so no distinction could be made in their income status. (Nasar A et al., 2016)

Jia Z, et al. (2010) conducted “a population based study and observed that the loss of a member of the family, being injured because of the disaster and witnessing someone being killed or injured by the earthquake have been contributory factors development of PTSD signs”.

Three years after Wenchuan Earthquake, survivors stated that maximum stress subscales negatively correlated with age, persistent illnesses, injury because of the catastrophe, domestic damage and family earnings had very strong negative relationship psychological well being of the earthquake victims. (Wen et al., 2012)

Signs and symptoms of PTSD had been considerably larger amongst circle of relatives of people, houses, residences or witnessed a person being killed or injured in the catastrophe; similarly to women, the displaced, and the injured. (Wen et al., 2012)

In Greece among wildfire catastrophe victims was observed that “those with damages to their homes had a worse satisfactory of existence as compared to those without any damages within the domains of mental health, social relationships and environment, whilst those with complete lack of assets had a lower pleasant of existence simplest in the environment domain” (Ootegem & Verhofstadt 2016)

Disaster Preparedness and Mitigation

Catastrophies are hard to plan and anticipate due to the fact they may be innately exclusive from commonplace emergency activities. At the same time as it's far proper to assume that each can result in large quantities of casualties and loss of belongingness.

The “aim of disaster preparation is to be able to reduce the immediate mortality and morbidity with a better prepared, well equipped service”. “The preparation includes early warning systems for seasonal changes in climate and risk of flood or drought such as electronic information systems and satellites that can provide information over large regions and continents”. “Separate systems are needed to cater for the agricultural sector, cities and people in rural or remote communities”. “The public health infrastructure is particularly important for the immediate measures needed and for public information on reducing the health risks” (Sena & Woldemichael, 2006)

“Disaster sufferers who had the trauma of the flood events and had been fearful of experiencing some other flood event, also had a great bad impact on their preferred quality of existence”. (Van Ootegem, L, Verhofstadt E, 2016)

Uttarakhand authorities need to focus on minimizing the damage to existence, belongings and surroundings before the catastrophe moves. At the prohibition degree, diverse schemes should be drafted for controlling the losses to lives and assets, to limit the results of disaster. There are numerous techniques to embark upon this level in which the disaster has not come about, in which there may

be a call for being better prepared and to have an effective of caution mechanism prior to the catastrophe. (Varghese & Paul, 2013)

“Equipped with the information about the hazards and their spatial distribution, the disaster managers in Uttarakhand may undertake certain preventive and alleviate trials for further strengthening and streamlining the Disaster Management System in the state and pave the way for similar activities in other states of India”. (Pande, 2010)

Even as restoring the state to normalcy, it is also equally necessary to ensure that if unluckily the disaster revisits, the volume of harm is lesser. Recovery includes help, rehabilitation and reconstruction. “Similarly to this, many protective steps could be taken to prevent if identical calamity recurs anyways”. (Varghese & Paul, 2013)

It’s very important that without delay after receiving slightest trace of a catastrophe, the information must reach the complete threat-susceptible area. The case of Uttarakhand in Flash flood catastrophe, it became visible that the country disaster management authority did not have a scheme with a purpose to curtail the catastrophe nor had the warnings issued through the meteorology department taken critically. (Varghese & Paul, 2013)

“Disaster Mitigation and management Centre at Dehradun (self reliant institute under the aegis of state authorities’ branch of Disaster Management) is answerable for formulating suitable guidelines and strengthening the abilities of both

the management and local population to manage up with all elements of catastrophe occurrence”. (Bhan, 2013)

The readiness, at the governmental, social and personal levels, to face the catastrophe effectively needs to be addressed early and it consists of sensible disaster-layouts. The nearby residents in conjunction with the state officials need to be sensitized regarding the measures taken in the course of disaster, such as landslides, floods, earthquakes and many others. So in case of such emergencies they can take necessary action. (Varghese & Paul, 2013)

Environmentalists blame the unplanned and unabated initiatives in the area particularly, hydel-energy initiatives for the existing crisis in the country. In uttarakhand “Reports stated forty five that hydropower tasks with a complete capability of >3,000 Mega Volts are operational inside the territory and around two hundred large and “small projects are proposed or below manner”. “In the Alaknanda-Bhagirathi basin alone, almost sixty nine hydropower projects with a complete ability of approximately 9,000 MW are underway”. “The implementation of those tasks is predicted to have an effect on about 65% of Alaknanda and 80 % cent of Bhagirathi River”. (Mukul P, 2013)

The immediate need is to ensure that the forewarning should reach to the native in prone-disaster area. In Uttarakhand, “despite the Indian Metrological Department issuing warnings well in advance, the government did not disseminate the disaster warning until June 16”. “Despite that, the pilgrimage was not stopped till the bridges finally collapsed”. “Education and awareness about natural hazards and risk mitigation should be a priority for all – decision makers and to the public”. “The

subject needs to be given precedence, for negligence will only result in another disaster”. (Bhan, 2013)

Material and Methods

The present study was conducted among post disaster victims of Kedarnath flood, June 2013. The samples selected were the Head and Next to Head members of all the houses. A multi-stage probability sampling technique was used to choose the geographical area. “Systematic random sampling with appropriate sampling interval was employed” to assess the base line and end line post traumatic symptoms. Total 2822 samples were included from four block areas and fourteen villages under Ukhimath. The data collection period was 25 months between the period Dec, 2013 to Dec 2015.

Objectives

1. To ascertain the magnitude/prevalence of PTSD among the Disaster victims of the Uttrakahand.
2. To estimate the H-QOL of the Disaster victims.
3. To study association, if any, between variables of PTSD and H-QOL of the victims on follow-up.
4. To study the association between demographic and other variables with Post Traumatic Stress Disorder among Disaster Victims.
5. To study the association between demographic and other variables with H-QOL of Disaster Victims.
6. To undertake a SWOT analysis of the ongoing Disaster preparedness and mitigation measures in the area of coverage.

Operational Definitions

Health related Quality of Life (H-QOL): In this study H-QOL refers to a disaster victims perception of position in their life in the context of health and health promotion in which they live and in relations to their goals, expectations, standards and concerns which was measured by WHO QOL- BREF.

Post Traumatic Stress Disorder (PTSD): In this study PTSD refers to deterioration of psychological health condition of a disaster victim that is triggered by a catastrophic event either directly or indirectly involved in it which was measured by PTSD checklist (PCL-S).

Natural Disaster Victims: In this study natural disaster victim refers to people living in Rudraprayag District, Uttarakhand been directly or indirectly experienced or witnessed the catastrophic event i.e. Cloudburst centered on 16th June 2013.

Conceptual Framework

Conceptualization is a process of forming ideas, which are utilized and forms conceptual framework for development of research design. It helps the nurse researcher to know what data need to be collected and gives direction to an entire research process. The conceptual framework for the study was developed by the investigator itself.

Catastrophic event creates an imbalance between Physical, Psychological, Social and Environmental health among the victims of the Disaster. Well being outcome evaluation after disaster allows to discover the group of disaster victims chance to develop chronic health troubles and occurrence of continual mental problems including post-traumatic strain disease than the others. The present conceptual framework focused to study the impact of catastrophic event on magnitude of PTSD & H-QOL of catastrophic afflicted individuals.

One of the most devastating effects of catastrophic experience can leads to development of Posttraumatic Stress Disorder and it is very common among the disaster victims. The important symptoms of post traumatic stress disorder were intrusive thoughts, nightmares and flashbacks of past traumatic events, avoidance of reminders of the trauma, hyper vigilance and sleep disturbance which was measured by PTSD checklist (PCL-S).

H- QOL of a human being is a state of dynamic interaction between mind, body, societal and ecological health. The 2013 flash flood hit the Uttarakhand had caused shortage of food supplies, electricity, clean water, banking services, and transportation and communication system also, disturbance of these above stated

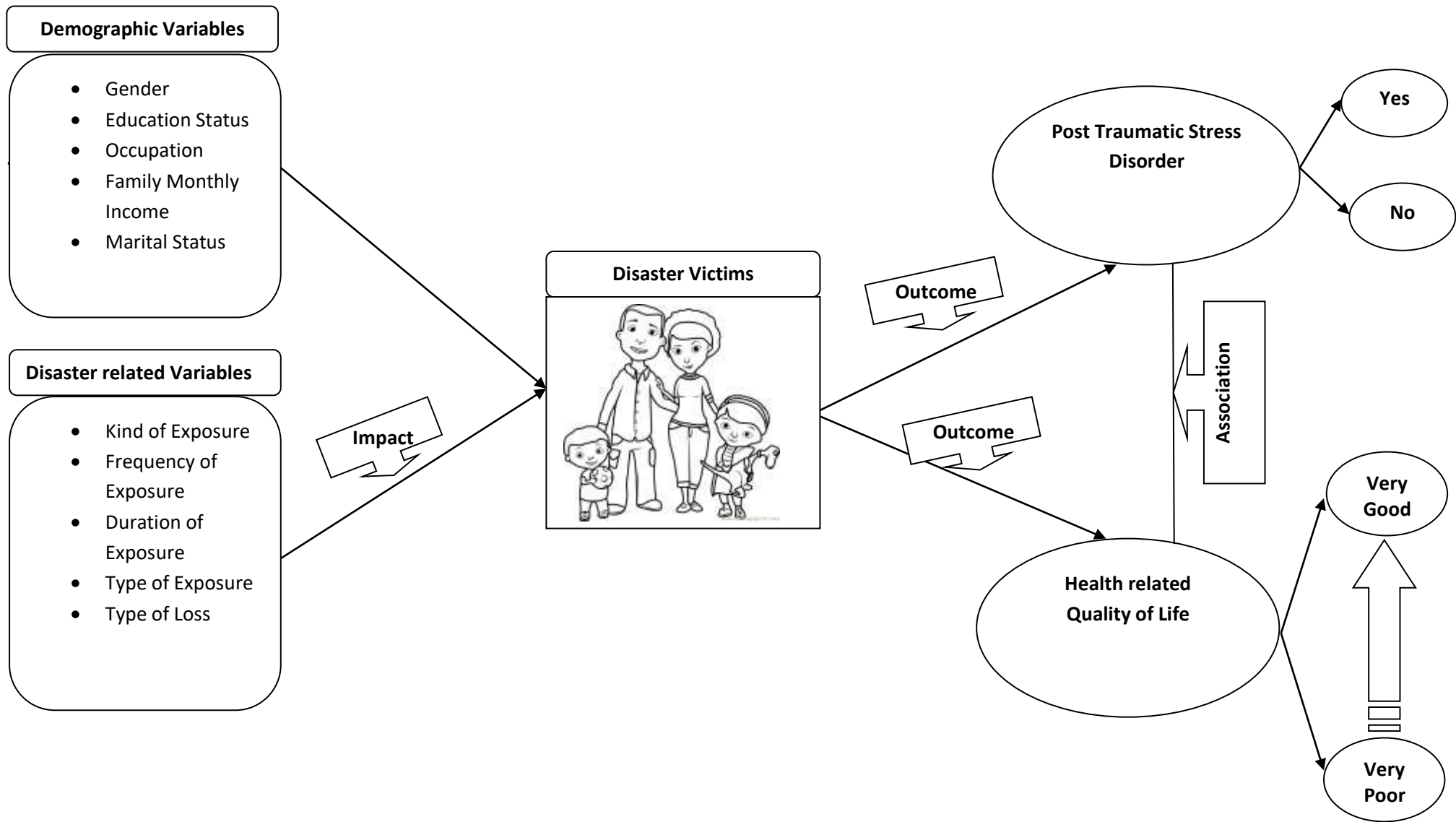
basic services may affect the victims life. In addition, Post Traumatic stress symptoms, which is a due to the psychological response of an individual towards catastrophic events, can have the 'long-term effects' on an individual. Therefore H-QOL of among disaster victims will be decreased which was measured by WHO QOL BREF.

Post traumatic stress symptoms usually have great influence on physical, psychological, social and environmental wellbeing of disaster victims because of its undesirable effect on health which may affect their day to day functioning. Hence, researcher planned to study the scientific association between Post Traumatic Stress Disorder and Health related Quality Life of a Disaster victims

However, the 'catastrophic effects on disaster victims differ from individual' based on Demographic (i.e. Sex, Educational Status, Occupation, Family Monthly Income and Marital Status) and Disaster related variables (i.e. Kind of Exposure, Frequency of Exposure, Duration of Exposure, Type of Exposure and Type of Loss) which was measured by researcher self made questionnaire.

The outcomes of the post Disaster impact have been studied extensively in two different phases. First assessment was done within 06 month of the catastrophic event and second assessment done after the period of 18 month.

The disaster victims who were found to have symptoms of PTSD and reported 'poor' & 'very poor' H-QOL will be advised to undergo counseling or any interventions (not included in the study) which may help them to get better H-QOL & cope with the situational crisis.



Hypothesis

H₁- Post- Traumatic Stress Disorder (PTSD) is significantly associated with the Health related Quality of Life of Post Disaster victims at the level of significance $p \leq 0.05$.

H₀₁- There is no significant association between Post- Traumatic Stress Disorder (PTSD) and Health related Quality of Life of Post Disaster victims at the level of significance $p \leq 0.05$.

Universe of study: Uttarakhand

As a region of mountains, this state has major threat from natural calamities. The recent tragedy, which the state witnessed, was Kedarnath flood in the year 2013. It washed away the largest number of inhabitants and visitors. Approximately One lac ten thousand families was evacuated from the disaster afflicted region. Total fatalities was close to 5000; with missing estimated number of 4,700. The actual toll was expected to be much higher than the observed numerical.

Study Population: Disaster victims of June, 2013 from the Rudraprayag District.

Rudraprayag is a district of Uttarakhand state of northern India. The district occupies an area of 2439 km per square. The district is bound by Uttarkashi District on the north, Chamoli District on the east, Pauri Garhwal District on the south, and Tehri Garhwal District on the south. The district Rudraprayag is located at the

convergence river Alaknanda and Mandakini (Both tributes of river Ganges) in the state of Uttrakhand.

Research Approach

The study design adopted had both Quantitative and Qualitative research as it was most appropriate to attain the data from the Disaster victims. Quantitative component of the study design was used to assess Prevalence of PTSD and post Disaster “H-QOL” among the afflicted. The Qualitative component study design was used to do SWOT analysis on ongoing disaster preparedness and mitigation process. The study was designed keeping in view the objective and expected outcome of the study.

Research Design

A cross-sectional design with prospective follow-up was adopted so the post-traumatic stress symptoms could be measured among Disaster victims. The post-traumatic stress was considered after six months from the event exposure, besides allowing for comparison with the baseline findings.

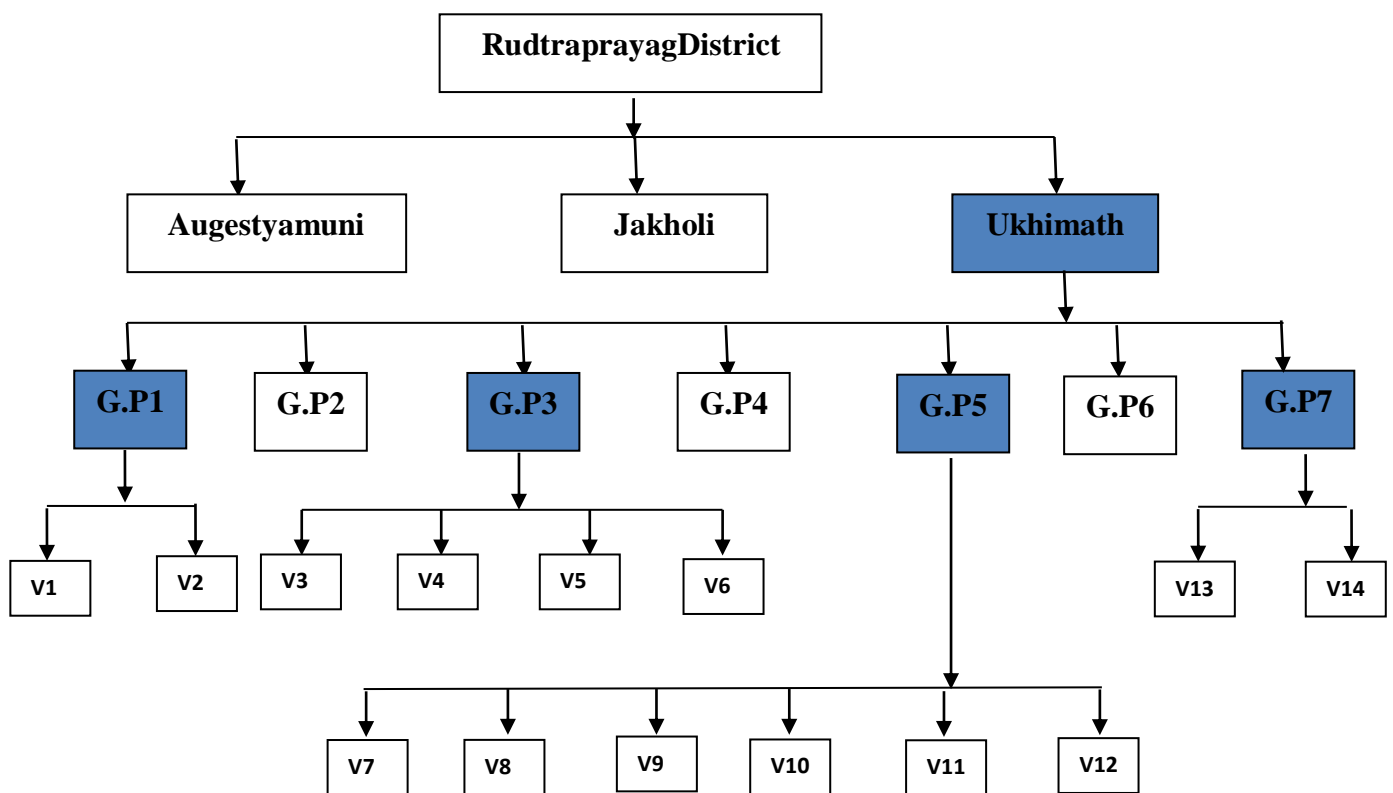
Setting of the Study

Ukhimath Block, Rudarapryag District, Uttarakhand, India.

S. No	Villages		
1	Trijugi Narayan	8	Banayadi
2	Kalimath	9	Nyalsu
3	Badasu	10	Chandrapuri
4	Jal Talla	11	Gangapur
5	Jal Malla	12	Lamgondi
6	Kotma	13	Devlibranigram
7	Nakot	14	Chaumasi

Sampling Technique

“A multi-stage probability sampling technique was used to choose the geographical area of coverage”. “Systematic random sampling with appropriate sampling interval was employed to sample study blocks & villages and calculate study subjects”. (Mahalingam V & Roy D, 2017)



The multistage systemic sampling was used to select the area; the process is depicted as follows;

At stage I: 01 Block (Ukhimath) was sampled from 03 blocks

At stage II: 04 Grampanchayats were sampled from a total of 07 Grampanchyats of the selected Block with a SI of 2 (30%)

At stage III: All the 14 Villages were selected from Sampled 04 Grampanchyats.

Inclusive Criteria

Disaster affected victims who were

1. “Head of the Family”.
2. “Next to head in the family”.
3. “Any individual directly injured in the disaster or in the family”.
4. “Non Alcoholic individuals”.
5. “Age > 14 years”. (Mahalingam V & Roy D, 2017)

Sample

The samples were the “Head and Next to Head” members “of all the households”. The total calculated houses were 1129 and considering 02 per family, the sample size calculated was “2258 i.e. 02×1129 ”. ‘Assuming 50% of the selected household’s i.e. 564 households” had “at least one injured person”; total sample was calculated to be 2822. (Mahalingam V & Roy D, 2017)

Base Line

The baseline data was collected from 2667 disaster victims at the time of data collection; the exact numbers of inhabitants in the selected region was less than the estimated numbers by the investigator.

End Line

The end line data was collected from 1719 Disaster victims out of 2667 as 948 respondent victims were either unavailable or had withdrawn or migrated to some other areas.

Study Tools/ Instruments

- 1. PTSD Checklist – Civilian Version (PCL-S) was used to find the magnitude/ prevalence of PTSD among Disaster victims.**

Language validity of the tool

“The PTSD scales were translated into the local language (Hindi) by bi-lingual experts with a translation and re-translation method”. “The discrepancies were discussed and sorted through consensus”. “These were additionally face-validated by bi-lingual psychiatrists”. (Mahalingam V & Roy D, 2017)

- 2. WHOQOL- BREF was used to measure the Health related QOL.**
- 3. Structured, pre-tested instrument to elicit Socio- Demographic and other variables.**

An instrument to elicit socio demographic data was developed based on literature review which was used to get details like “Age”, “Gender of the participant”, “Educational Status”, “Occupation”, “Family monthly income”, “marital status”, “Kind of disaster exposed”, “Frequency of exposure”, “Duration of exposure and type of loss”. (Mahalingam V & Roy D, 2017)

SWOT Analysis

SWOT analysis was done under two main categories

- 1. Mitigation**
- 2. Preparedness**

Mitigation:

Mitigation involved 8 subheadings with sub statements, which included soil conservation, new crop pattern, human settlements, self-constructed houses, roads, warning systems, organizing counter disaster strategy and vulnerability.

Preparedness

Preparedness included 10 sub-statements related to biological needs of disaster victims at the time of emergency which included communication, food, health, water supplies, sanitation, shelter, child care, logistics management, public education and rescue teams.

Data Collection

Study subjects were administered the chosen instruments by household survey to elicit the information related to PTSD, Health related QOL and Socio-Demographic and related data. Data collection was started at six (6th) month post - disaster for baseline observation and at eighteenth (18th) month of post- disaster to assess variation, if any of symptoms of PTSD & indices of H-QOL.

Research Assistants

A total of fifteen (15) ASHA workers were selected who were already staying in the village with disaster victims. For each village, one ASHA worker was assigned to collect the data. These selected ASHA workers formally were formally imparted training on trained in a different sessions. “They were trained in the study process and materials, on how to approach and discuss the study with the participants and in supporting them in the process of going through the questionnaires and explaining the questions when needed by the participants”. “Some of the participants, especially those who were elderly or had no formal education, needed help in writing their responses”. “Research assistants remained available throughout the data collection process; they provided the study questionnaires to the participants and collected them following completion. 1500 INR were paid for each ASHA worker”.

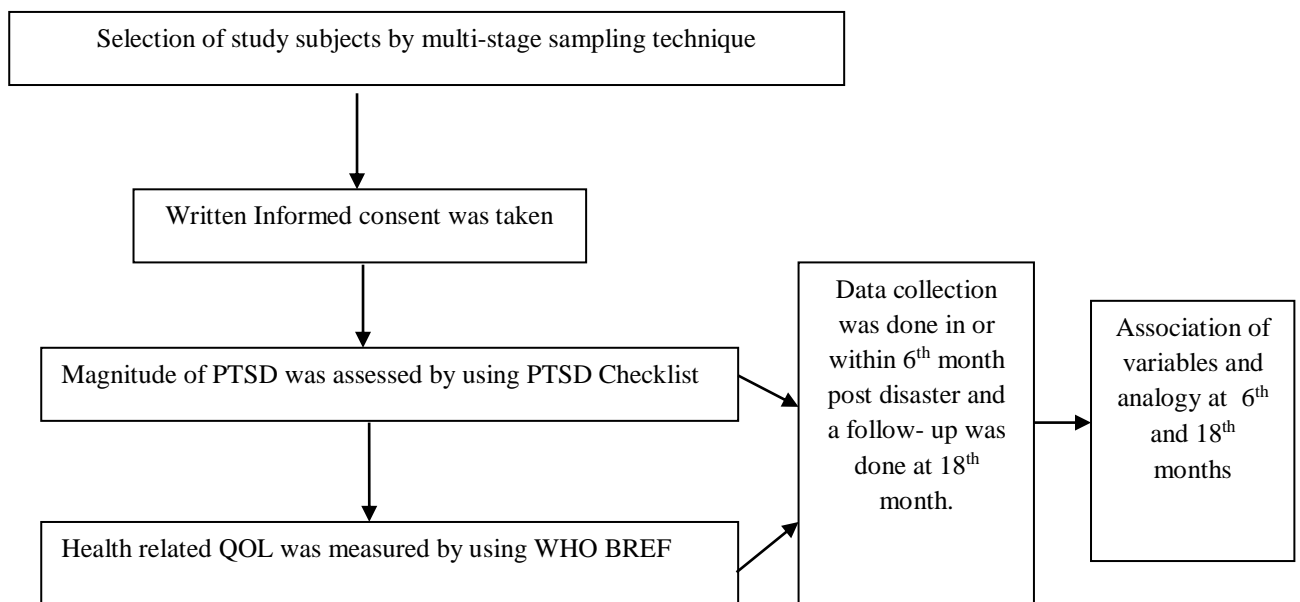
Focus Group Discussions (FGDs) and In Depth Interview’s (IDI’s)

The qualitative component of the study was based on FGDs and IDIs. Participants of 7 FGDs and 9 IDIs from 14 villages (i.e. Trijugi Narayan, Kalimath, Badasu, Jal Talla, Jal Malla, Kotma, Nakot, Banayadi, Chandrapuri, Gangapur, Lamgondi, Devlibranigram, Nyalsu and Chaumasi) of Ukhimath block of district Rudraprayag were recruited by convenient sampling. Representatives of PRI, teachers, priests, social workers, NGO representatives, government officials, ANMs, AWWs, ASHAs and significant others constituted the respondents.

The FGDs were moderated by skilled moderator. Interpersonal relationship was maintained by the Rapporteur among the participants. All responses of members

were recorded by Recorder and members comprised of 8-16 participants. Duration of discussion was between 60 -90 mins.

Study Protocol



Pilot testing

A pilot study was conducted in Guptakashi village, Rudraprayag District to assess the feasibility and practability of the study and to decide the statistical analysis for the researcher. The subjects for pilot study meet the same criteria as the sample for final study. Seventy six disaster victims were interviewed about their PTSD symptoms and H-QOL in within three month of disaster occurrence. The PTSD and H-QOL were analyzed by using descriptive and inferential statistics. The study was found to be feasible.

Ethical Considerations

The purpose of the study was explained and written informed consent was obtained from the study participants.

Analysis

Collected data was analyzed using SPSS version 19. Results obtained were interpreted by using descriptive methods/statistics. Associations among variables were ascertained by application of either parametric or non-parametric tests, depending on data variables at a significance level of 0.05. Content analysis/ Nominal Impression from FGDs and IDIs were done from transcripts/records.

RESULTS

The results of the study are presented under the following headings

1. “Distribution of study subjects by Socio Demo-Graphic and other Variables”.
2. “Prevalence/Magnitude among Disaster victims”.
 - i. PTSD
 - ii. H-QOL
3. “Association of variables in Disaster victims”.
 - i. PTSD & H-QOL.
 - ii. Demographic & other variables with PTSD.
 - iii. Demographic & H-QOL.
4. “SWOT analysis regarding ongoing Disaster preparedness and mitigation measures”. (Mahalingam V & Roy D, 2017)

I. Socio Demo-Graphic and other Variables

Table No: 1.1 Distribution of Study participants according to Socio Demo-Graphic and other Variables showed following results

- One third(32%) of the study participants were aged between 25-34 years, every fourth participant (26%) was aged between 35-44 years, every fifth (20%) between 45-54years of age and almost every tenth participant (11%, 9%) were aged between 14-24 & 55-64 years.
- Gender wise both male (50.5%) and female (49.5%) participants were almost equal.
- Every fifth (20%) of the study participant did not have formal education; although 39% had primary education and one third (33%) had secondary level of education.
- Approximately half (54%) of the study participants were non skilled inhabitants, and one third (31%) had no livelihood, only 15% of the study participants were skilled workers.
- The Greatest (84%) number of the study participants family monthly income was between the Rupees of 5001-20000 and 9% had income more than rupees of 20000 monthly.
- Most (93%) of the participants were married and 7% were living single.
- Every second (49%) study participant was afflicted with water associated disaster, 30% suffered with land allied disaster and every fifth (21%) afflicted with road associated disasters.

- Exposure to disaster events, only 39% of the study participants exposed once and majority (71%) were exposed twice or more.
- Duration of exposure in terms of weeks, almost half (46%) of the study participants reported one week of continuous exposure and more than half (54%) reported more than two weeks continuous exposure to a disaster events.
- Approximately two third (64%) experienced 'non-life threatening' situations and remaining one third (36%) participants reported 'life threatening experience' during disaster events.
- Type of loss during disasters shows 44% of the study participants suffered impairments and loss of property and remaining (56%) reported no property loss.

Table No: 1 Distribution of Study subjects by Socio Demo-Graphic and other Variables

(N=2667)

S. No	Variable	Frequency	Percentage(%)	
1.	Age in Years	14-24	300	11
		25-34	842	32
		35-44	702	26
		45-54	521	20
		55-64	244	9
		65-74	58	2
2.	Gender	Male	1321	50.5
		Female	1346	49.5
3.	Education status	No formal Education	524	20
		Primary education	1051	39
		Secondary education	866	33
		Tertiary education	226	8
4.	Occupation	Skilled	407	15
		Non skilled	1432	54
		No occupation	828	31
5.	Family monthly	<5000	176	7
		5001-10000	1074	40

	income	10001-20000	1173	44
		>20000	244	9
6.	Marital status	Single	183	6.9
		Married	2472	92.7
		Separated	12	.4
7.	Kind of disaster exposed	Water	1302	49
		Land	772	30
		Road	593	21
8.	Frequency of exposure	1	1041	39
		2	761	29
		3	865	32
9.	Duration of exposure	1week	1215	46
		2week	213	8
		3week	118	6
		4week	1121	42
10.	Type of exposure	Potentially life threatening	963	36
		Not potentially life threatening	1704	64
11.	Type of loss	Any impairment/disability/death	368	14
		Loss of property	807	30
		None	1492	56

II. Prevalence of PTSD among Disaster victims.

2.1 Prevalence of PTSD among Disaster victims at Baseline

Figure No: 8 shows the baseline prevalence of PTSD among disaster victims. Whereas, every second (51%) disaster victim experienced symptoms of PTSD, others (49%) did not meet the post-traumatic stress disorder criteria. The total population covered to assess the baseline was 2667. Thus it could be inferred that all the participants had experienced some level of stress, but half of the participants could not overcome the stress.

(N=2667)

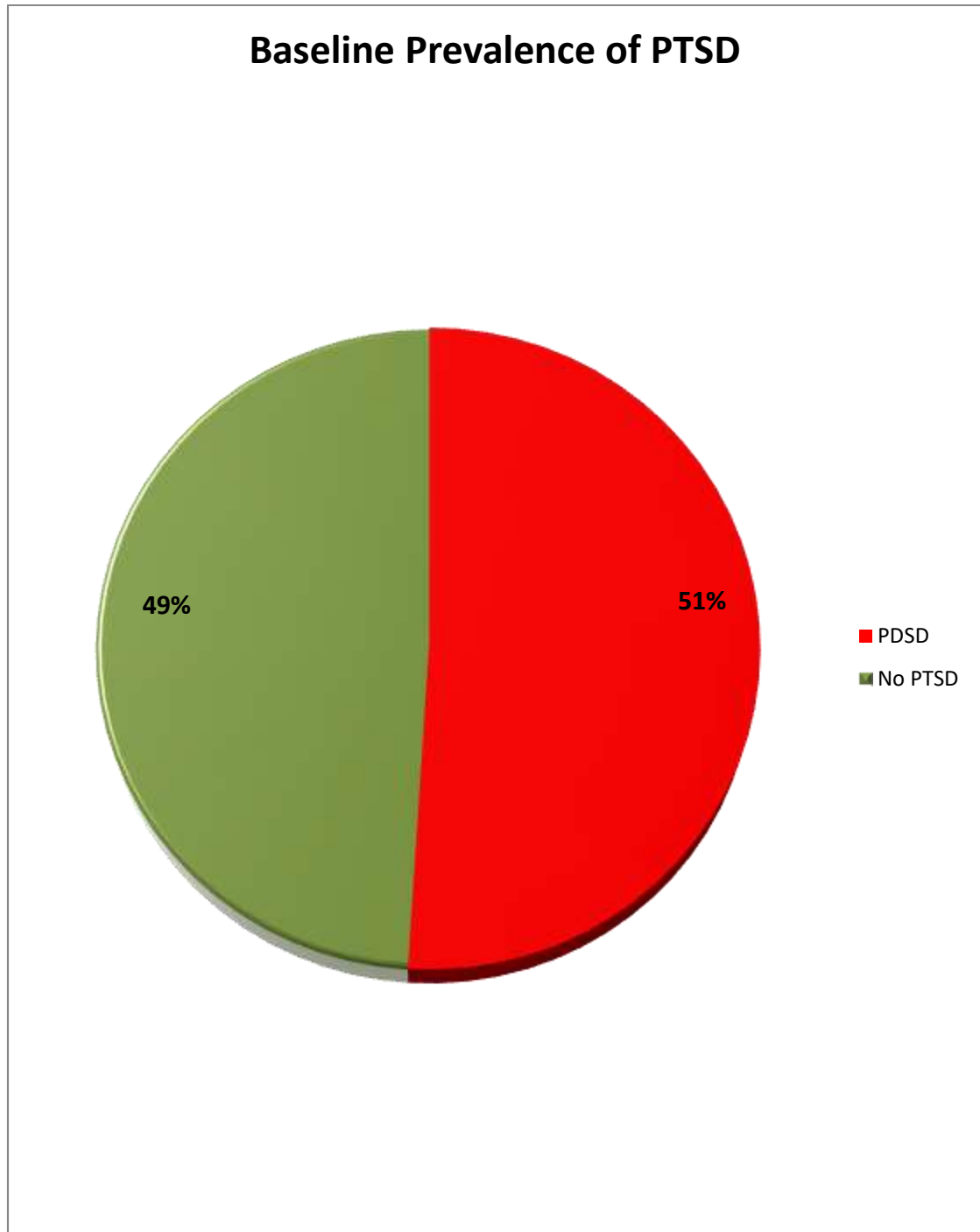


Figure No: 8 Prevalence of PTSD at Baseline

2.2 Prevalence of PTSD among Disaster victims at End line

Figure No: 9 shows the prevalence of posttraumatic stress symptoms after disaster exposure. End line prevalence showed that every fifth (22%) disaster victim met the criteria of PTSD symptom and 78% of disaster victims overcame the stress.

(N=1719)

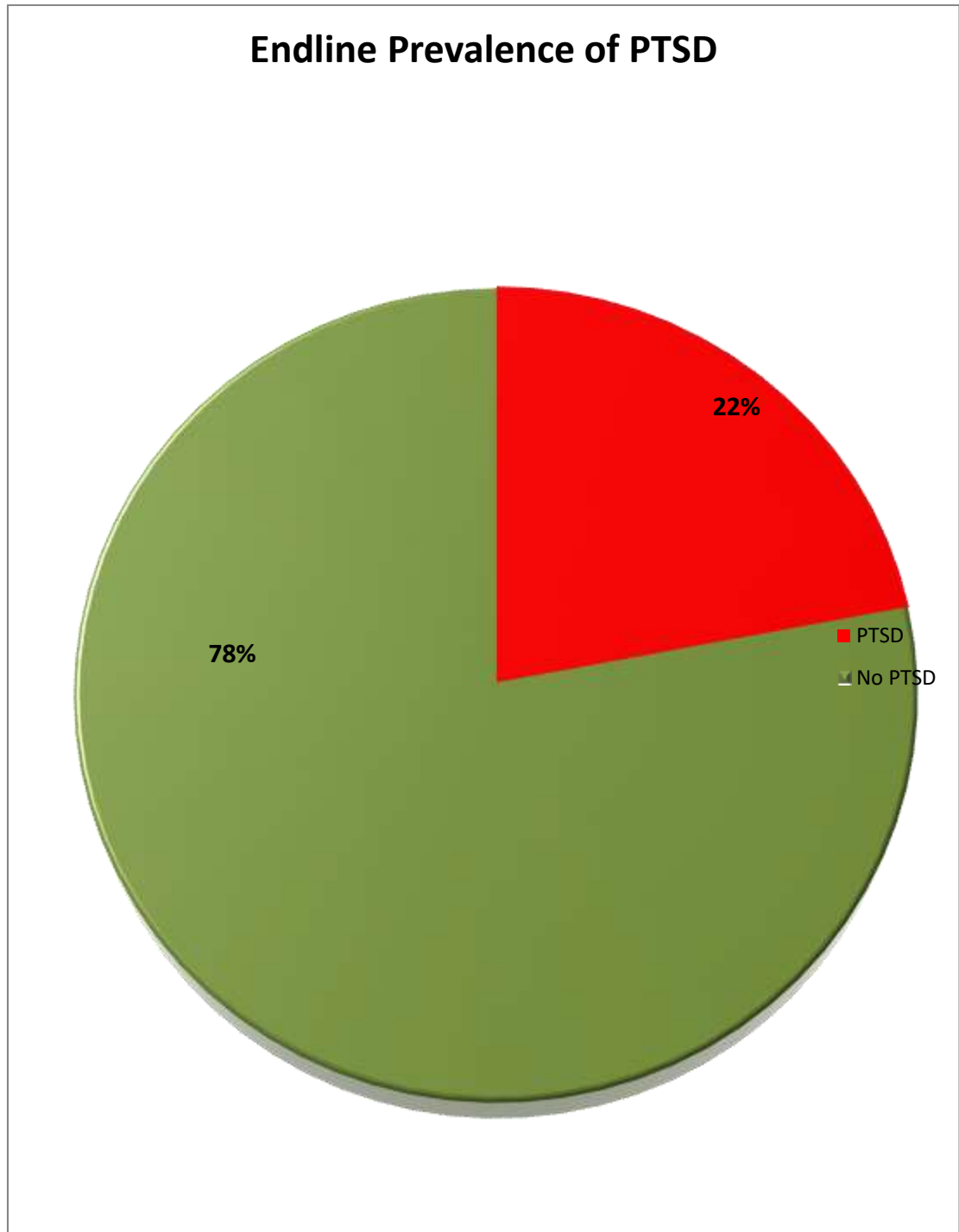


Figure No: 9 Prevalence of PTSD in End line

2.3 Comparison of Baseline PTSD with End line PTSD

Table No. 2.1 depicts the variation between baseline and end line symptoms of post stress symptom among disaster victims. Baseline PTSD mean score (51.02±18.8) was higher among disaster victims with post disaster stress symptoms. On the other side, end line post disaster stress symptoms mean score (38.9±18.2) declined among disaster victims. Hence it could be interpreted that the base line PTSD mean score is significantly higher than the end line PTSD mean score at the level of significance $p \leq .05$. Thus it could be concluded that with the passing of time people either adjusted and adapted into situation, which helped them to attain a coping mechanism at the prevailing circumstances.

Table No: 2.1 Comparison of Baseline PTSD with End line PTSD
(N=1719)

S. No	PTSD	Mean± S.D	't' value	'p' value
1.	Baseline	51.02±18.8	21.10	.0001
2.	End Line	38.9±18.2		

df=1718, level of significance $p \leq .05$

III. Magnitude of HQOL Disaster victims

3.1 Magnitude of HQOL of Disaster victims at Baseline

Table No 3.1 depicts HQOL of Disaster victims at baseline which is categorized in five different domains. Over all H QOL score was found to be 'poor' ($1.76 \pm .43$). Sub scales of Health related QOL like physical ($2 \pm .03$); social ($2 \pm .02$) and environmental H-QOL ($2 \pm .01$) were found to be 'poor'. And psychological domain of H- QOL of disaster victims was found to be 'very poor' as it was $1.1 \pm .40$. These study results confirms the relationship between mind and body, if one would affected other will inversely be affected. The psychological parameters are contingent on environmental, physical and social influence also.

Table No: 3.1 Baseline Magnitude of HQOL of Disaster victims

(N=2667)

S. No	QOL(domain wise)	Mean \pm S.D	Interpretation
1	Total (across all domains)	1.76 \pm .43	Poor
2	Physical	2.0 \pm .03	Poor
3	Psychological	1.1 \pm .40	Very Poor
4	Social	2.0 \pm .02	Poor
5	Environmental	2.0 \pm .01	Poor

3.2 Magnitude of HQOL of Disaster victims at End line

Table No 3.2 illustrates end line HQOL domain wise scores of disaster victims. Total Health related QOL score at end line was found to be improved from the baseline $2.53 \pm .43$ and it was 'neither poor nor good'. This could be interpreted that H-QOL of disaster victims were at least not worsening. Other domains like physical ($3.02 \pm .06$), Social ($3.7 \pm .71$) showed improvement. The radical improvement was seen in environmental ($4.1 \pm .05$) domain. Even though psychological domain was also found to be nominally improved from 'very poor' to 'poor' ($1.9 \pm .30$). These findings suggest that time heals even though its gradual but surely it helps.

Table No: 3.2 End line Magnitude of HQOL of Disaster victims

(N=1719)

S. No	QOL(domain wise)	Mean \pm S.D	Interpretation
1	Total (across all domains)	2.53 \pm .43	Neither poor nor Good
2	Physical	3.02 \pm .06	Good
3	Psychological	1.9 \pm .30	Poor
4	Social	3.7 \pm .71	Good
5	Environmental	4.1 \pm .05	Very Good

3.3 HQOL comparison between Baseline and End line

Table No 3.3 demonstrates difference between baseline and end line H QOL among disaster victims. The total score across all domains indicates significant improvement in symptoms at the end line ($2.53 \pm .43$) at the significant level of $p \leq .05$, compared to the time when the exposure was recent and the wounds were novel. Each domain improved with time implying correlation duration since exposure.

Table No: 3.3 H Quality of Life comparison between Baseline and End line

(N=1719)

S. No	QOL(domain wise)	Base Line	End Line	't' value	'p' value
		Mean ± S.D	Mean ± S.D		
1	Total (across all domains)	1.76±.43	2.53±.43	52.49	.0001
2	Physical	2.0±.03	3.02±.06	63.45	.0001
3	Psychological	1.1±.40	1.9±.30	66.33	.001
4	Social	2.0±.02	3.7±.71	99.22	.0001
5	Environmental	2.0±.01	4.1±.05	170.7	.0001

df=1718, level of significance $p \leq .05$

IV. Association between PTSD & HQOL

(by correlation & regression)

Table No 4.1 describes rankings of quantifying PTSD and HQOL scores of disaster sufferers. “The rankings between PTSD and QOL was found negatively correlated i.e. -0.91 at the level of significance $p \leq 0.05$ ”. “The beta score (-1.259) in correlation shows that an increase of a unit of PTSD score results in a fall of QOL rating by 1.259 units a among the catastrophe sufferers”. “The beta rating (-2.213) in correlation indicates increase of a unit of PTSD rating results in fall of social health score through 2.213 units a among the disaster victims”. “Rankings for different domain names of health related QOL i.e. physical, mental, Social and environmental also correlated negatively with PTSD rating at the level of significance $p \leq 0.05$ ”. So it can be interpreted that research hypothesis (H_1) accepted and null hypothesis (H_0) rejected. “Scores highlighted the relation between two variables these were statistically observed to be negatively correlated”. (Mahalingam V & Roy D, 2017)

Table No: 4.1 Association between PTSD & Health related QOL

(N=2667)

S. No	Variables	r value	β	Sig
1.	TOTAL QOL & PTSD	-.91**	-1.259	.0001
2.	Physical QOL & PTSD	-.87**	-.334	.0001
3.	Psychological QOL & PTSD	-.85**	-.310	.0001
4.	Social QOL & PTSD	-.822**	-2.213	.0001
5.	Environmental QOL & PTSD	-.876**	-.372	.0001

V. Association between Demographic and other variables with PTSD

Table No 5.1 exemplifies association between demographic and other variables with PTSD among disaster victims.

- Both gender Females (53.4%) & Males (49.3%) were found to have more or less equal chances to develop PTSD symptoms if exposed to disaster. The association between gender and PTSD symptoms shows statistical significant at the $p \leq 0.05$ level.
- Non- Formally educated Disaster victims (61.28%) compared to primary education (51%), secondary education (48.5%) and tertiary education (44.7%) significantly ($p \leq 0.05$) had been developed PTSD.
- The disaster victims who had no occupation (59.5%) were significantly afflicted more with PTSD compared to non-skilled (49.2%) and Skilled (43.3%) disaster victims.
- Disaster victims with monthly family income <5000 (83%) had been significantly ($p \leq 0.05$) developed PTSD compared to income 10001-20000(52.2%), >20000(51%) and 5001-10000(45.7%).
- Non marital (77%) disaster victims had higher probability to develop PTSD than the separated (50%) and married (49.6%) at the significant level $p \leq 0.05$.
- Victims exposed to disasters involving land (56.8%), compared to water (53%) and road (40%) significantly ($p \leq 0.05$) had more chances to developed PTSD.
- The victims exposed thrice (57%) to a disaster have significant risks ($p \leq 0.05$) to developed PTSD, compared to those who were exposed ≤ 2 (47.6%) times.

- The victims who had exposed one week(53%), two week(55%), three week(49.2%) and four week to a disaster more or less equal chance to develop PTSD at the significant level $p \leq 0.05$.
- Disaster victims who experienced 'life threatening' situations (93.8%), approximately three times has added risk to develop PTSD than those who were not exposed to 'non-life threatening' conditions (27.6%) at the significant level of $p \leq 0.05$.
- Those victims with any type of impairments (96.3%) and property loss (93.5%) during disaster have greater risk to develop PTSD more than six times compared to those who had not suffered any loose of property'(17.6%) at the significant level of $p \leq 0.05$.

The above data displays a risk of developing PTSD among both the genders, Victims who had no formal education, not working, with low family income. The data also suggest that people who lives single or were not married are at greater risk. Type of disaster experienced also plays cruciate role in development of PTSD. Disaster victims whose lands are being destroyed in disaster had greater threat of developing PTSD. Study also concludes that more the exposure to disaster and life threatening situations and loose of property, the more are the chances of suffering with PTSD.

Table No: 5.1 Association between Demographic and other variables with PTSD

(n=2667)

S. No	Variable		PTSD<50	PTSD>50	Sig
1.	Gender	Male	667 (50.4%)	654 (49.6%)	.006
		Female	628(46.6%)	718(53.4)	
2.	Education status	No formal Education	209(39.8%)	315(61.2%)	.0001
		Primary education	515 (49%)	536 (51%)	
		Secondary education	446 (51.5%)	420 (48.5%)	
		Tertiary education	125(55.3%)	101 (44.7%)	
3.	Occupation	Skilled	231(56.7%)	176 (43.3%)	.0001
		Non skilled	728(50.8%)	704 (49.2%)	
		No occupation	336(40.5%)	492(59.5%)	
4.	Family monthly income	<5000	30(17%)	146(83%)	.0001
		5001-10000	584 (54.3%)	490 (45.7%)	
		10001-20000	561(47.8%)	612(52.2%)	
		>20000	120(49%)	124(51%)	
5.	Marital status	Single	42(23%)	141(77%)	.0001
		Married	1247(50.4%)	1225(49.6%)	

		Separated	6 (50%)	6 (50%)	
6.	Kind of disaster exposed	Water	613(47%)	689 (53%)	.0001
Land		329(43.2%)	443 (56.8%)		
Road		353 (60%)	240 (40%)		
7.	Frequency of exposure	1	523(50.2%)	518 (49.2%)	.001
2		399 (52.4%)	362(47.6%)		
3		373 (43%)	492 (57%)		
8.	Duration of exposure	1week	571(47%)	644(53%)	.0001
2week		96 (45%)	117(55%)		
3week		60 (50.8%)	58 (49.2%)		
4week		568 (50.6%)	553 (49.4%)		
9.	Type of exposure	Potentially life threatening	60 (6.2%)	903 (93.8%)	.0001
Not potentially life threatening		1235(72.4%)	469 (27.6%)		
10.	Type of loss	Any impairment/disability/death	12 (3.2%)	356 (96.8%)	.0001
Loss of property		53 (6.5%)	754 (93.5%)		
None		1230 (82.4%)	262 (17.6%)		

VI. Association between Demographic and other variables with Health related QOL.

Table No 6.1 presents “the association between Demographic, other variables and Health related QOL of the disaster victims”. (Mahalingam V & Roy D, 2017) The results shows that the one of significant determinants of Health related QOL of disaster victims was Gender (74.8 ± 26.0), where female victims were more susceptible to losing the Health related QOL. Victims educational status showed people with formal education had poorer Health related QOL. Skilled (44.5 ± 18.7) occupation victims were reported to have poorer Health related QOL. The victims have higher family monthly income i.e. >20000 (47.8 ± 17.6) were significantly diagnosed Low Health related QOL. Separated (46.0 ± 19.8) from the spouse victims reported significantly decreased Health related QOL. In kind of disaster to have exposure, victims exposed to land related disaster were significantly shown very poor Health related QOL (46.3 ± 19.1). The victims had experienced 3 times (73.0 ± 28.2) or more significantly loosed their Health related QOL. In duration of exposure the researcher couldn't find any statistical evidence related to Health related QOL of the Disaster victims at the significant level ≤ 0.05 . Potentially life threatening (55.2 ± 15.9) situations experienced victims significantly found to be developed poorer Health related QOL. Study also concludes that more the exposure to disaster and life threatening situations and loose of property, the more are the chances of experiencing low health Quality of life among disaster victims.

Table No: 6.1 Association between Demographic and other variables with Health related QOL

(N=2667)

S. NO	Variable		Mean ±S.D	Sig
1.	Gender	Male	81.1 ±25.8	.0001
		Female	74.8 ±26.0	
2.	Educatio n status	No formal Education	56.9 ±18.3	.0001
		Primary education	51..3 ±19.0	
		Secondary education	48.3 ±18.5	
		Tertiary education	45.8 ±17.1	
3.	Occupati on	Skilled	44.5 ±18.7	.0001
		Non skilled	49.4 ±17.5	
		No occupation	57.0 ±19.6	
4.	Family monthly income	<5000	63.80 ±17.9	.0001
		5001-10000	49.7 ±17.7	
		10001-20000	50.9 ±19.5	
		>20000	47.8 ±17.6	
5.	Marital status	Single	60.3 ±17.0	.0001
		Married	50.3 ±18.8	
		Separated	46.0 ±19.8	

6.	Kind of disaster exposed	Water	52.1 ±17.9	.0001
		Land	46.3 ±19.1	
		Road	52.4 ±19.0	
7.	Frequency of exposure	1	79.2 ±25.2	.0001
		2	81.6 ±23.8	
		3	73.0 ±28.2	
8.	Duration of exposure	1week	78.7 ±25.8	.547
		2week	77.5 ±24.4	
		3week	76.1 ±26.5	
		4week	77.3 ±26.5	
9.	Type of exposure	Potentially life threatening	55.2±15.9	.0001
		Not potentially life threatening	90.7 ±21.6	
10.	Type of loss	Any impairment/disability/death	72.32±10.8	.0001
		Loss of property	65.0±10.6	
		None	38.1±12.8	

VII. SWOT analysis regarding ongoing Disaster preparedness and mitigation measures.

Table No: 7.1 SWOT analysis regarding ongoing Disaster preparedness and mitigation measures.

S. No	S- Strength
1.	<ol style="list-style-type: none">1. Active stake holding by NGOs.2. Community resource support (man, material, money).3. Involvement of community at all phases of management.4. Committed sponsors/funders /development agencies supporting disaster risk reduction.5. Support by the State Disaster cell.6. Inter-sectoral coordination.

S. No	W- Weakness
2.	<ol style="list-style-type: none"> 1. The “link between early warning information available and actions taken is currently weak”. 2. Weak institutional capacity. Skewed focus on Disaster emergency response and longer-term management. 3. Inadequate human resources (motivated & trained). 4. Lack of an operational ‘Disaster Policy’ and supportive framework. 5. Lack of sensitization & awareness of Disaster preparedness. 6. Lack of knowledge on man made “ecological imbalances /climate change and consequences. Inadequate weather and climate data collection; lack of infrastructure and manpower to collect, analyze and disseminate Disaster early warning information”. 7. Lack of tested & sound preparedness and mitigation plan. 8. Evidence of inefficient application of mitigation strategies. 9. Limited resource allocation. 10. Delay in allocation, approval and disbursement of funds. <p>Limited recourses allocated to support disaster risk reduction institutional structures.</p>

S. No	O-Opportunities
3.	<ol style="list-style-type: none"> 1. To develop a relevant Disaster policy and facilitate its implementation. 2. To develop sound& piloted strategies for preparedness and mitigation of disasters. 3. To establish/ improve institutional capacity (Infrastructure, trained personnel, mobilization of resource, emergency response). 4. To empower the community at all phases management (training and sensitization). 5. “Promotion of alternative livelihoods to enhance communities coping capacity including innovative farming technology and practices”. 6. Creation of a ‘multi-sectoral systems approach’ for sustainable management. Community endorsed/ sponsored initiatives in furthering outreach services.

S. No	T- Threats
4.	<ol style="list-style-type: none"> 1. Top down' management approach without community needs assessment (CNA) and situational analysis. 2. Non effective & non replicable preparedness and mitigation plan. 3. Inefficient mobilization and allocation of resources among stakeholders 4. Abuse of resources and exploitation of real beneficiaries. 5. Complacency toward Geo-climatic changes predisposing to Disasters. 6. Lack of pro-activeness of community in enhancing and sustaining its capacity for disaster preparedness and mitigation measures. <p>Inadequate intersectoral coordination and communication at the various institutional/stakeholder level.</p>

DISCUSSION

Catastrophes, natural whether, man-made, have great potential to put negative effect on psychological health of human beings. Numerous consequences can be seen because of all types of disasters. “It is also important to help survivors to recognize the normalcy of most stress reactions to disaster. Mild to moderate stress reactions in the emergency and early post-impact phases of disaster are highly prevalent among survivors, their families and community members”. (Mahalingam V & Roy D, 2017) Although stress reactions may seem 'extreme' and could cause distress among people which generally do not become prolonged glitches. Among most of the people as they recover fully from moderate stress within 6 to 18 months.

One of the most debilitating effects of traumatic experience is a condition called Posttraumatic Stress Disorder (PTSD). This disorder is very common among victims/survivors of tormented exposure. The current literature suggests that factors contributing to increased risk of developing PTSD can be caused by many variables, of which one is exposure to traumatic events.

The aim of this study was to identify Quality of Life in various domains of health and assess symptoms of PTSD among disaster victims. However, research findings suggest that people can have unique consequences of mental health.

Prevalence of PTSD among Disaster victims

The present study observed the after effects of post-traumatic stress disorder symptoms from six months of the disaster up to 18 months. It was found that every second disaster victims was experiencing PTSD symptoms. All the disaster victims

had experienced some level of stress and half of the victims were so distressed that they were handling able to overcome the hassle happened in their life physical and emotional.

In addition after eighteen month of Disaster, it was found that every fifth disaster victim had PTSD (PTSD-S) symptoms, which was a sequential improvement factor in traumatic symptoms. Kar N, Krishnaraaj R, Rameshraj K. (2014) “in their study projected 70.9% of the tsunami victims had diagnosis of PTSD. High prevalence of posttraumatic symptoms had been reported in various groups following the tsunami”.

Eighteen percent (n=160) of the disaster survivors reported PTSD symptoms on the Self-Rating Scale for PTSD after 18 months post-disaster exposure. (Dirkzwager A J 2007)

“Far-off higher rates of PTSD, which included 44% associated symptoms with a dam break and flood.53% of following bushfires”, “54% after airplane crash landings, and 50%-100% exposed to a plane crash into a shopping mall”. (Green B L, Lindy J D, Grace M C. et al 2011)

A well being outcome evaluation after disaster allows to discover the groups of survivors with accelerated two to three times threat for chronic health troubles. occurrence of continual mental problems including post-traumatic strain disease than the others. (Grievink et al., 2004)

Study conducted by Khattak S R & Khattak S U (2014) reveals that most people who suffer from various calamitous events like floods have “increased risk of

developing PTSD symptoms and need specialized mental health services in order to manage their symptoms”.

In a study by Nasar A, Zulqarnain S, Inayat A, Khan M N S (2016) study results showed that most common disorder found among flood victims was Posttraumatic Stress Disorder (PTSD) followed by Generalized Anxiety Disorder and Major depressive Disorder. After a typhoon disaster 61.93% of the victims showed positive results in screening for psychological stress symptoms and 399 (7.8%) were tested for having apparent PTSD symptoms.(Guo et al., 2016)

Comparison of Baseline PTSD with End line PTSD

The PTSD mean score was more among disaster victims with post disaster stress symptoms after six months since exposure. On the other hand, eighteen months after disaster occurrence post stress symptoms mean score had significantly declined among disaster victims. Hence it can be interpreted that the after six months of exposure PTSD mean score was significantly higher than the eighteen month score. Thus it could be concluded that with the passing of time people either adjust and adapt into situation, which help them to work proficiently and live happy life.

Chen L & Liu A (2015) had performed “Meta-analysis at the occurrence of Posttraumatic stress ailment after floods and observed that the incidence of PTSD became decrease at 6 or more months after a flood (eleven.45%) than within 6 months (16.01%) of a flood”.

Magnitude of H-QOL Disaster victims

In the present study the investigator found that after six months of disaster overall Health related QOL score was 'poor'. The sub scales of Health related QOL like physical, social, and environmental were found to be 'poor'. And psychological domain of disaster victims was found to be 'very poor' as it was before. These study results confirms the relationship between mind and body, if one would affect other will inversely be affected. The psychology is pretentious on environmental factors, physical and social influences play a role too. "Post- traumatic stress signifies the association between quality of life distressing by major life events occurred in an individual's life". (Mahalingam V & Roy D, 2017)

Although, Eighteen month after disaster exposure, total Health related QOL score was improved from the baseline scores as it fell in criteria 'neither poor nor good'. From this it could be interpreted that disaster victims improved gradually in all aspects of their life. Other domains also showed improvement. The radical improvement was seen in environmental domain, even though psychological aspect was also found to be improved a little from 'very poor' to 'poor'. The findings suggested that time heal. Even though it's slow, but surely it helps. A study conducted by Waelveerakup W (2014) found that the overall "quality of life of the flood survivors in Thailand" was at moderate level. The findings of this study "indicated that all (100%) of survivors in social relationship domains on the "quality of life were either good or moderate". "98.9% of people showed either good or moderate level improvement in the quality of life related to psychological domain".

Piyasil V, Thammawasi T, Tasri L, Chaiyakun P, Ketumarn P, Pityaratsatian N et al (2014) study results showed that after six years of Tsunami effect afflicted student's 15.1% of students had low quality of life, 68.7% had moderate & 16.2 had high quality of life. Eighteen percent had good (27-42) score, 38% had a fair (27-32) score and 44% had a poor (< 27) score.

Xiangdong W, Huabiao Z, Chengzhi Z , Yucun S, Naotaka S reported that incidence of quality of life of disaster victims close to the epicenter of the earthquake. The result suggests that closest area group said poorer physical health as measured with the aid of WHOQOL-BREF and greater mental signs in terms of somatisation and tension.

H-QOL comparison between Baseline and End line

There are research that look at the results of trauma and post-traumatic strain ailment on QOL; In a longitudinal study it was found that “Determined that, for the complete sample, the flash flood adversely affected the victim’s quality of life in bodily, psychological, social and environmental domain names at 6 months and it become drastically stepped forward 18 months after the catastrophe”. (Mahalingam V & Roy D, 2017)

The longitudinal design study observed “that the victims of the earth- quake had an impaired quality of life in the physical, psychological and environmental domains after three months of disaster and within the psychological and environmental domain names 9 months later”. (Wang et al., 2000)

Association between PTSD & Health related QOL

In the present study the scores between PTSD and QOL was found negatively correlated. “The beta score in correlation indicates that a rise of a single unit of PTSD score results in a fall of total of QOL score by 1.259 units among the disaster victims”. (Mahalingam V & Roy D, 2017) The beta rating in correlation indicates increase of a one unit of PTSD rating effects in fall of social health score with the aid of 2.213 units the various catastrophe sufferers. “Rankings for different domains of health associated QOL i.e. physical, mental, Social and environmental also correlated negatively with PTSD rating”. (Mahalingam V & Roy D, 2017) Those ratings perceive the relation among variables which have been statistically observed to be negatively correlated.

Rick Nauert (2011) identified that symptoms tied to heightened arousal which include sleeping problem, irritability and vigilance were associated with decrease quality of life among PTSD sufferers. Anxiety and depression have been additionally related to lower first-rate of life.

In 2016 Wang Z , Xup J Conducted a co relational study and found that “PTSD was found to be negatively associated with the Sichuan earthquake victim QOL and social support had a major effect on moderating the association between the PTSD and QOL in Sichuan earthquake victims parents”.

Papanikolaou V, Adamis D, Kyriopoulos J (2012) “losses from the disaster suffers for longer time from secondary psycho- social troubles which may additionally impair the quality of lifestyles within the community for quite some time”.

“PTSD symptoms seem to adversely impact physical health functioning via their negative effect on health symptoms, which in turn negatively influence day-to-day functioning”. “While it seems intuitive that the impact of health on day-to-day functioning has much to do with the number and frequency of somatic symptoms, particularly for military veterans and other trauma victims seeking treatment for PTSD such health symptoms appear to be set in motion by PTSD”.(Jennifer et al., 2008)

Posttraumatic stress and depression confirmed considerable poor relations to QOL; in comparison. Consequently, individuals who stated the catastrophe brought approximately advantageous private adjustments did no longer document higher stages of QOL. (Jennifer et al., 2008)

The height of the mental issues amongst survivors happens within the first year after the onset of the catastrophe. The mental troubles because of disaster might also last for years if not dealt with early. (Norris,et al., 2001)

Association between Demographic and other variables with PTSD

In the present study, a ‘significant difference’ found between ‘male and female’ total means of PTSD. Victims who had no formal education, not working, with low family income shown higher PTSD symptoms. The data also suggest that people who lives single or were not married are at greater risk to develop PTSD. Type of disaster experienced also plays cruciate role in development of PTSD. Disaster victims whose lands are being destroyed in disaster had greater threat of developing PTSD. “Study also concludes that more the exposure to disaster, life threatening situations and loose of property, the more are the chances of suffering with PTSD”. (Mahalingam V & Roy D, 2017)

Males had a better “level of social support”, psychological wellbeing and “quality of life” as compared to females. This reveals the fact that females are more prone to developed psychological symptoms and ailments like PTSD. (Rapid Response Plan 2011)

In Pakistan people who belongs to low socioeconomic status were not prone to develop stress reaction “as well as symptoms of Post-Traumatic Stress Disorder” (PTSD). This could be due to the fact that the people living in the community had approximately the same level of income annually and no distinction was made in their income status. (Nasar et al., 2016)

Signs and symptoms of PTSD had been considerably larger amongst circle of relative’s people, houses, and residences or witnessed a person being killed

or injured in the catastrophe; similarly to women, the displaced, and the injured. (Wen et al., 2012)

“Damage because of the disaster, domestic or property loss and score of the three-12 months PTSD signs, but positively correlated with higher training and better family income”. (Wen et al., 2012)

Within the wellbeing related QOL Scales, distinguished capability hazard factors had been stated, i.e. Gender, education popularity, occupation, own family month-to-month earnings, marital marriage, sort of disaster exposed, Frequency of publicity, form of exposure and form of loss except duration of exposure.

“Disaster sufferers who had the trauma of the flood events and have been fearful of experiencing some other flood event, also had a great bad impact on their preferred quality of existence”. (Van Ootegem, L, Verhofstadt E. 2016)

Uttarakhand authorities need to focus on minimizing the damage to existence, belongings and surroundings before the catastrophe moves. At the prohibition degree, diverse schemes should be drafted for controlling the losses to lives and assets, to limit the results of disaster. There are numerous techniques to embark upon this level in which the disaster has not come about, in which there may be a call for being better prepared and to have an effective of caution mechanism prior to the catastrophe. (Varghese & Paul, 2013)

“Equipped with the information about the hazards and their spatial distribution, the disaster managers in Uttarakhand may undertake certain preventive and alleviate trials for further strengthening and streamlining the Disaster

Management System in the state and pave the way for similar activities in other states of India”. (Pande, 2010)

Even as restoring the state to normalcy, it is also equally necessary to ensure that if unluckily the disaster revisits the volume of harm is lesser. Recovery includes help, rehabilitation and reconstruction. “Similarly to this, many protective steps could be taken to prevent if identical calamity recurs anyways. (Varghese & Paul, 2013)

It’s very important that without delay after receiving slightest trace of a catastrophe, the information must reaches the complete threat-susceptible area. The case of Uttarakhand in Flash flood catastrophe, it became visible that the country disaster management authority did not had a scheme with a purpose to curtail the catastrophe nor had been the warnings issued through the meteorology department taken critically. (Varghese & Paul, 2013)

“Disaster Mitigation and management Centre at Dehradun (an self reliant institute under the aegis of state authorities’ branch of disaster management) is answerable for formulating suitable guidelines and strengthening the abilities of both the management and local population to manage up with all elements of catastrophe occurrence”. (Bhan, 2013)

The readiness, at the governmental, social and personal levels, to face the catastrophe effectively needs to be addressed priorly and it consists of sensible disaster-layouts. The nearby residents in conjunction with the state officials need to be sensitized regarding the measures taken in the course of disaster, such as

landslides, floods, earthquakes and many others. So in case of such emergencies they can take necessary action. (Varghese & Paul, 2013)

Environmentalists blame the unplanned and unabated improvement in the area particularly, hydel-energy initiatives for the existing crisis in the country. “Reports stated forty five that hydropower tasks with a complete capability of >3,000 Mega Volt are operational inside the territory and around two hundred large and “small projects are proposed or below manner”. “In the Alaknanda-Bhagirathi basin alone, almost sixty nine hydropower projects with a complete ability of approximately 9,000 MW are underway”. “The implementation of those tasks are predicted to have an effect on about 65 % cent of Alaknanda and 80 % cent of Bhagirathi river”. (Bhan, 2013)

The immediate need is to ensure that the forewarning should be reached to the native in prone-disaster area. In Uttarakhand, “despite the Indian Metrological Department issuing warnings well in advance, the government did not disseminate the disaster warning until June 16”. “Despite that, the pilgrimage was not stopped till the bridges finally collapsed”. “Education and awareness about natural hazards and risk mitigation should be a priority for all – decision makers and to the public”. “The subject needs to be given precedence, for negligence will only result in another disaster”. (Bhan, 2013)

Strength of the Study

- The project was first of its kind with a cross-sectional design and multi-stage probability sampling approach to explore prospectively H-QOL, PTSD and association of related variables among Disaster victims in Uttarakhand.
- The reliable and representative outcome of the sample study has the potential to be extrapolated to analogous study settings and to far larger population for making and implementing effective strategies for Disaster preparedness and mitigation.

Limitation of the Study

- The analysis of the study findings has not factored in confounding factors i.e. genetic and biological predictors/ determinants.
- Study being based on self-reports, responses may have ‘recall’ bias (victims could have difficulty in remembering the events in actual order of occurrence and trauma associated).
- The instrument of PCL-S was developed and validated vis-à-vis western socio demographic and cultural perspective, which could influence the reliability and validity of elicited response from our study subjects.

Implication of the Study

A number of implications were generated from the study.

- Nursing personnel/care givers need to be trained and develop requisite skill to be able to serve during trying times of Disasters.
- PTSD symptoms must be prioritized for treatment aimed at improving H- QOL among Disaster victims.
- The study helped to understand the role of community (community ownership and stake holding) in Disaster preparedness and mitigation measures.
- Significant association of variables from social domain of QOL and PTSD implies an important role of societal attributes i.e. relationship, sense of belonging, love, dependence and mutual trust etc. in enhancing quality of life people with PTSD.

Conclusion & Recommendations

- “The findings of present study highlight requisite need for identification and intervention for PTSD for Disaster Victims in context of developing countries”. (Mahalingam V & Roy D, 2017)
- “The scope of the study may be extended into a larger sample and coverage area; the initiative has the potential to be replicated at socio-epidemiological state with similar perspective”. (Mahalingam V & Roy D, 2017)
- “PTSD may persist for several years after a disaster that may result in various functional impairment in affected people both physically and psychologically”. (Mahalingam V & Roy D, 2017)
- “Required treatment program should be organized to cure post-disaster stress along with assessment, diagnosis and interventions for survivors should be taken as priority goal in a program of public health”. (Mahalingam V & Roy D, 2017)
- “Both community and provider capacity unit for disaster-preparedness and mitigation system should be built. Imparting appropriate coping skills to deal with post disaster affects via proper designed modules is an imperative need”. (Mahalingam V & Roy D, 2017)
- Research studies can also test whether treatment targeting PTSD symptoms have a beneficial effect on H-QOL and whether interventions specifically effectively reduce PTSD symptoms.

Summary

The cross-sectional design with prospective follow-up study was carried out on disaster victims affected by flash flood in the year 2013; a “multi-stage probability sampling technique (Systematic random sampling with appropriate sampling interval) was used”. The sampling was carried out in *three stages*, at 1st stage-01 Block (Ukhimath) was selected out of 03 blocks. At 2nd stage -04 Grampanchayats were sampled out of **07** Grampanchyats of the selected Block with a SI of 2 (30%). At stage 3rd: all *fourteen* Villages were selected from four Grampanchyats. “Considering the Head and Next to Head of the family all the households (1129) to be 2258 i.e. (02×1129) and assuming 50% of the sampled households i.e.564 households with at least one injured person at home the baseline observation was conducted on **2667** individuals and End Line observations were conducted on **1719**”. (Mahalingam V & Roy D, 2017)

The present study observed that One third (32%) of the study participants were aged between 25-34 years. Gender wise both male (50.5%) and female (49.5%) participants were almost equal. Both gender Females (53.4%) and males (49.3%) were found more or less equal chances to develop PTSD symptoms if exposed to disaster. The association between gender and PTSD symptoms shows statistical significant at the $p \leq 0.05$ level. The results also shows that the significant determinants of Health related QOL of disaster victims were Gender (74.8 ± 26.0), where Females victims are more susceptible to losing the Health related QOL.

Every fifth (20%) study participant was not educated formally and had (61.28%) significant ($p \leq 0.05$) chances to develop PTSD. Victims educational status

showed people with formal education had poorer Health related QOL. The disaster victims who had no occupation (59.5%) were significantly afflicted more with PTSD, Occupation victims were reported not good as well in Health related QOL. Approximately half (54%) of the study participants were non skilled inhabitants, the disaster victims who had no occupation (59.5%) were also significantly suffer with PTSD symptoms.

Disaster victims with monthly family income <5000 had significantly developed PTSD compared to income those who earn 10001-20000 rupees monthly. The Greatest (84%) number of the study participants fell into category of family income of <5000. Most (92.7%) of the participants were married and only (6.9%) were found living single. Non marital disaster victims had higher probability to develop PTSD than the separated and married at the significantly level.

Each subsequent study participant grieved water associated disaster, Victims exposed to disasters involving land (56.8%), compared to water had more chances to developed PTSD. Participants exposed twice or more (57%) to a disaster have significant risks to developed PTSD, compared to those who were exposed ≤ 2 (47.6%) times. The victims who had experienced 3 times exposure to disaster (73.0 \pm 28.2) were significantly had low Health related QOL.

Duration of exposure in terms of weeks, almost half (46%) of the study participants reported one week continuous exposure and more than half (54%) reported more than two weeks continuous exposure to a disaster events. The victims who had exposed one week (53%), two week, three week and four week to a disaster more or less equally chance to develop PTSD at the significant level. In duration of exposure the researcher couldn't find any statistical evidence relate with Health

related QOL of the Disaster victims. Potentially life threatening situations experienced victims significantly found to be developed lesser Health related QOL

Approximately two third (64%) experienced ‘non-life threatening’ situations and remaining one third (36%) participants reported ‘life threatening experience’ during disaster events. Disaster victims who experienced ‘life threatening’ situations (93.8%), approximately three times has added risk to develop PTSD than those who were not exposed to ‘non-life threatening’ conditions (27.6%) at the significant level $p \leq 0.05$. Study also concludes that more the exposure to disaster and life threatening situations and loose of property, the more are the chances of experiencing low Health Quality of life among disaster victims.

Type of loss during disasters showed 44% of the study participants suffered impairments and lost property’ and remaining (56%) reported no property loss. Those victims with any type of impairments (96.3%), and property loss (93.5%) during disaster have greater risk to develop PTSD more than six times compared to those who had not suffered any loose of property’(17.6%) at the significant level $p \leq 0.05$.

Each second (51%) disaster victims experienced symptoms of Post-Traumatic Stress Disorder (PTSD-S) at six month of the Disaster event. And at eighteen month after the disaster event prevalence showed that every fifth (22%) disaster victim met the criteria of PTSD (PTSD-S) symptom.

Baseline PTSD means score (51.02 ± 18.8) was higher among disaster victims with post disaster stress symptoms. On the other side, end line post stress symptoms mean score (38.9 ± 18.2) declined among disaster victims. Hence it could be

interpreted that the base line PTSD mean score is significantly higher than the end line PTSD mean score at the level of significance $p \leq .05$.

Total Health related QOL was found to be better-quality from the baseline. This could be taken as disaster victims are refining in all aspects of their life with the time. Other domains like physical ($3.02 \pm .06$), Social ($3.7 \pm .71$) showed improvement. The far-reaching improvement was seen in environmental ($4.1 \pm .05$) domain. Even though psychological aspect was also found to be improved which suggests that time is a great healer even the healing is on-going but surely it supports.

Difference between baseline and end line Health related QOL among disaster victims across all domains indicates significant improvement in symptoms at the end line ($2.53 \pm .43$) at the significant level of $p \leq .05$ as compared to the time when the exposure was recent and the wounds were novel. Each domain improved with time passing by which may possibly be concluded that every domain allied with each other.

The ratings among PTSD and QOL turned into found negatively correlated i.e. – “0.91 at the level of significance $p \leq 0.05$. The rating (-1.259) in correlation shows that a rise of a one unit of PTSD rating results in a fall of QOL rating through 1.259 units a number of the catastrophe victims”. “The beta score (-2.213) in correlation shows rise of a one unit of PTSD rating results in fall of social wellbeing score by way of 2.213 units many of the catastrophe sufferers”.

Scores for specific domains of wellbeing associated with “QOL i.e. physical, psychological, Social and environmental also correlated negatively with PTSD

rating at the level of significance $p \leq 0.05$ ". These scores identify the relation between two variables which were statistically found to be negatively correlated.

Analysis regarding ongoing Disaster preparedness and mitigation measures was taken and the SWOT analysis shows the strength was NGO's came upfront and played a vital role in rehabilitation activities, support from community was also granted. The weakness was weak institutional capacity for disaster victims, also inadequate human resource available for providing needed care.

This disaster event has given the opportunity and warning too, for further preparedness and framing lifesaving technologies and to enhance the financial support as well as the resources in times of need. The threats are growing day by day as the global warming and manipulation with the environment has made human race to face consequences. Inadequate budget framework, allocation among community stakeholders is essential to get corrected with in time space.

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